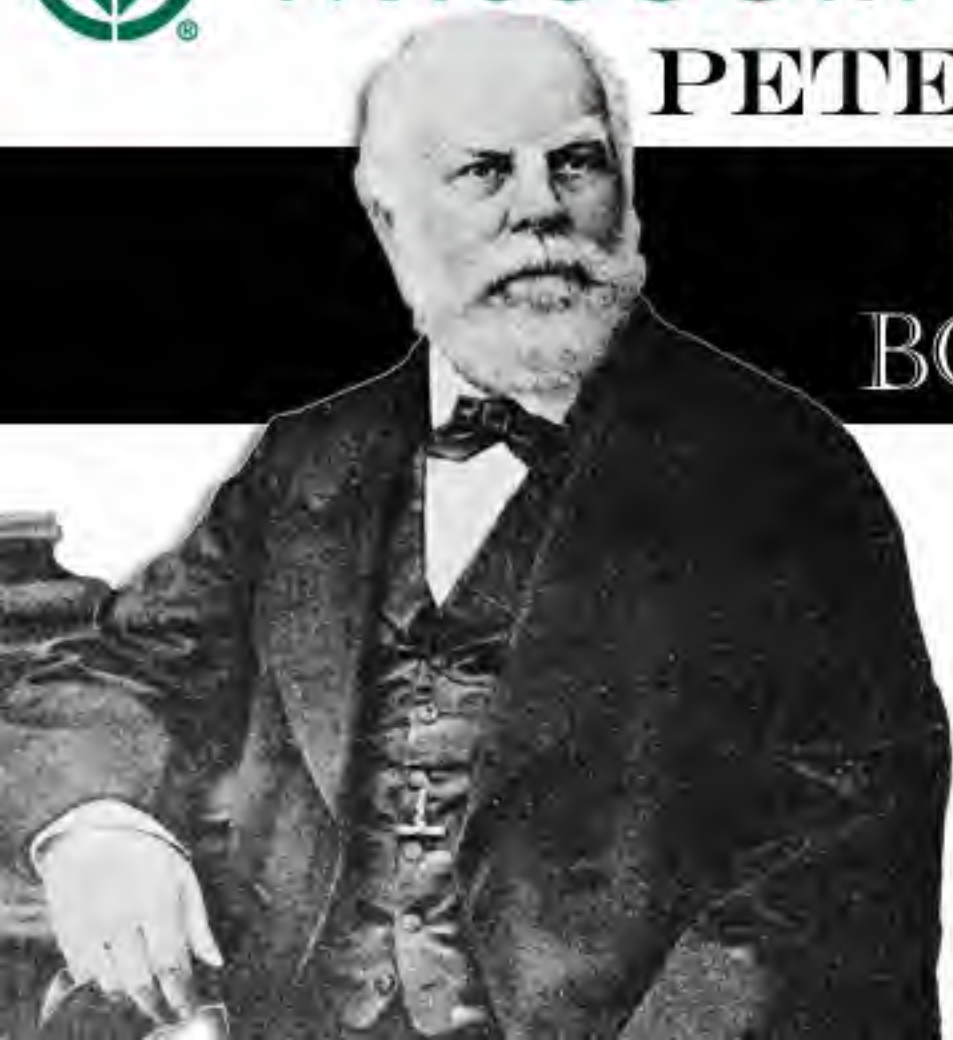


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BOTANICAL NOTEBOOKS



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8 Feb

21

P. aristata

397-404



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GARDEN

11373

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GEORGE ENGELMANN PAPERS



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4

Pinus aristata

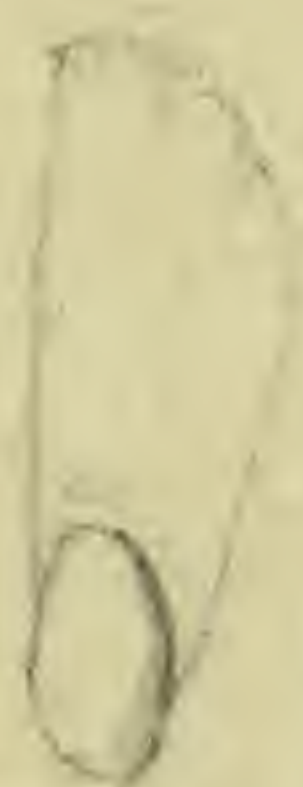
April 1862



x2



1.0



2.6



1.0



1.6



2.6

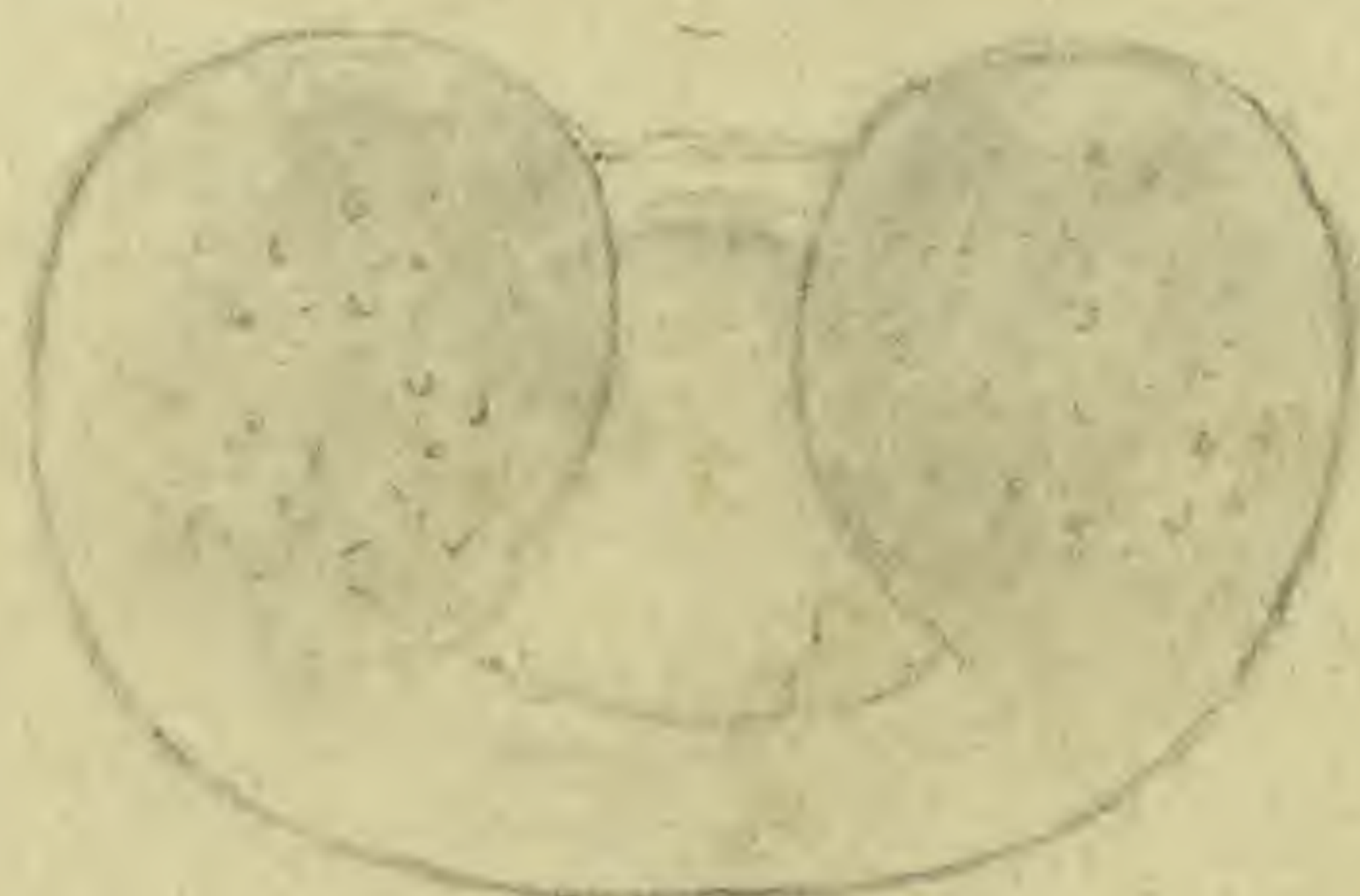


2.0



nat size

x415



Pollen 0.036

x30

anther, dry, open
side viewanther soaked
top view

9.6



x100



x8



x10

9.0



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MISSOURI
BOTANICAL
GARDEN

11374

M. W. ALEXANDER,

SOUTH-EAST CORNER OF FOURTH AND MARKET STREETS,
ST. LOUIS.

415 / 1500 / 0.036
1245
2.550
2490

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GEORGE ENGELMANN PAPERS



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Pinus aristata
Colorado, Penn

April 1862

same section
dry

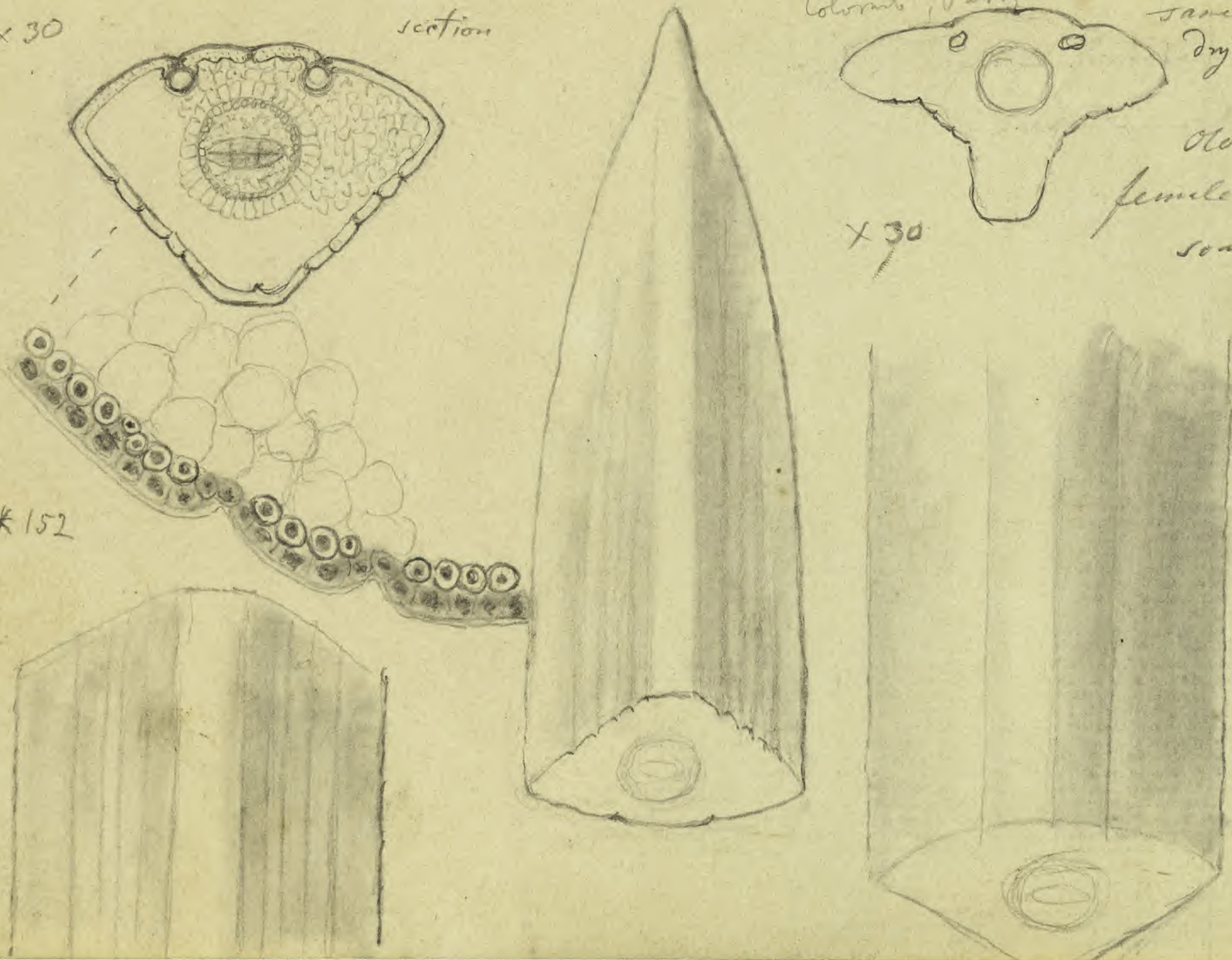
old leaf of
female plant
soaked in
water

x 30

section

x 30

* 152



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GARDEN

P. aristata

May 1862

x 10



crest



no crest.

anthers



4 scales of Anther

bract bent down.



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GARDEN

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ALEX. LEITCH,
DARY & PHARMACEUTIST,

ding Cor. Fourth & Olive Sts. St. Louis, Mo.

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GARDEN

Pinus aristata
May 1862



ovule, seed, wing
young, etc.

x 6

Male aments



leaf



0 1 2 3 4 5 6 7 8 9 10

cm

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GEORGE ENGELMANN PAPERS



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GARDEN



0 1 2 3 4 5 6 7 8 9 10

cm

copyright reserved

Pinus aristata 1862

Dec 1862

x2



x2



x10



bract, tip member
lower part thickened

3 seeds exam.
all with 7 styled
c



0 1 2 3 4 5 6 7 8 9 10
cm

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APOTHECARY & CHEMIST,

Cor. 4th and Olive Sts., St. Louis.

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This may belong to *P. flexilis* - No!

Pinus aristata

Aug 1861

Perry 1861

0.039



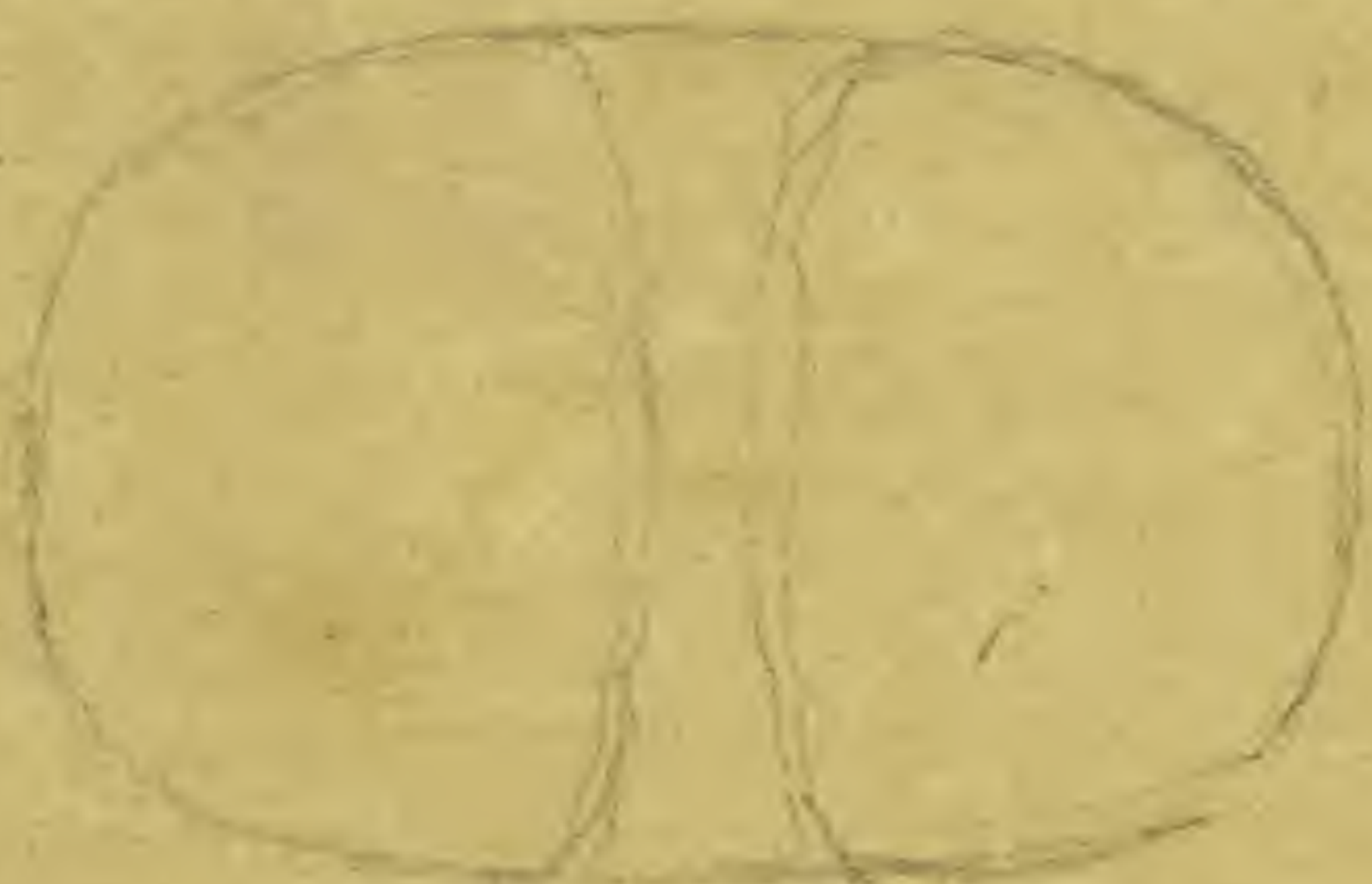
0.037



0.034



0.035



0.032 - 0.037



mean abt 0.035



x4



four involucre scales oval
of equal length
2 outer, lateral ones
boat shaped.

11379



0 1 2 3 4 5 6 7 8 9 10

cm

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COR. FIFTH & MARKET STREETS,

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J. M. Kittick & Co. Cor. Main & Vine.

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Pinus Balfouriana

Hol Bot Priebing

1 Sept 1869

April 10 1871

x 30

x 30

sections of leaves
of same bundle

x 150

Chlorophyll cells

wood

bark



0 1 2 3 4 5 6 7 8 9 10

cm

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MISSOURI
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GARDEN

11381

Leitch & Corlies

Druggists

South West
Corner Fifth
and Market
Streets

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS



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Pinus aristata var

April 1 1871

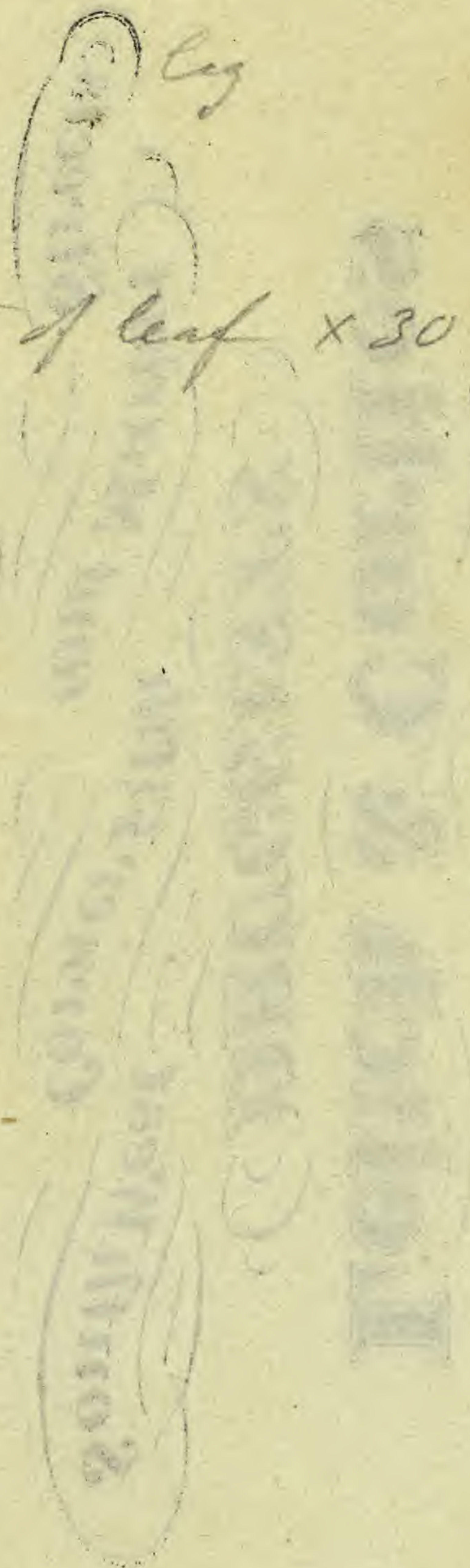
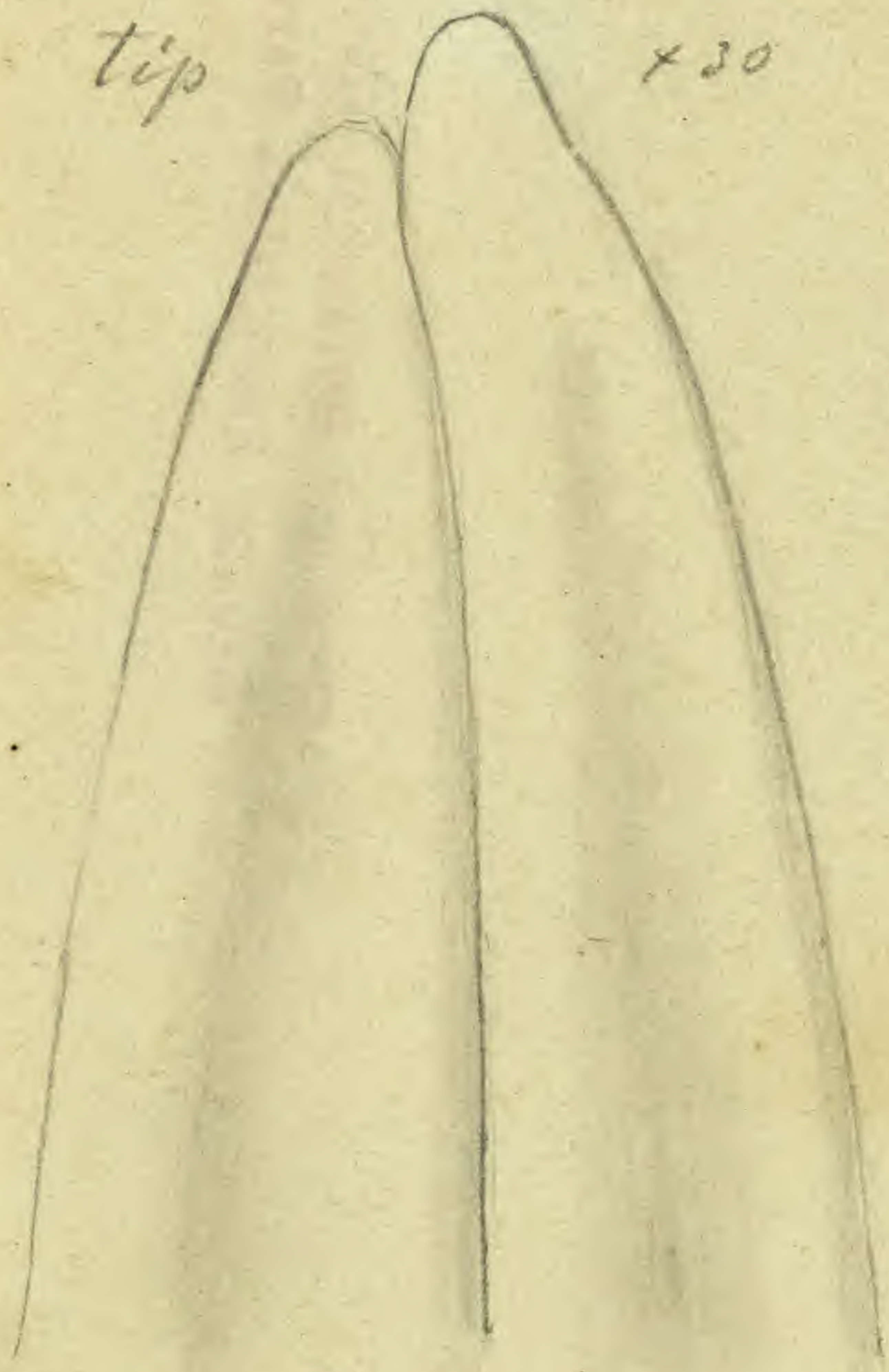
California, Hoffmann

double leaf

tip

x 30

section of leaf x 30



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GARDEN

11382

Leitch & Corlies

Druggists

South West
Corner Fifth
and Market
Streets

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GEORGE ENGELMANN PAPERS



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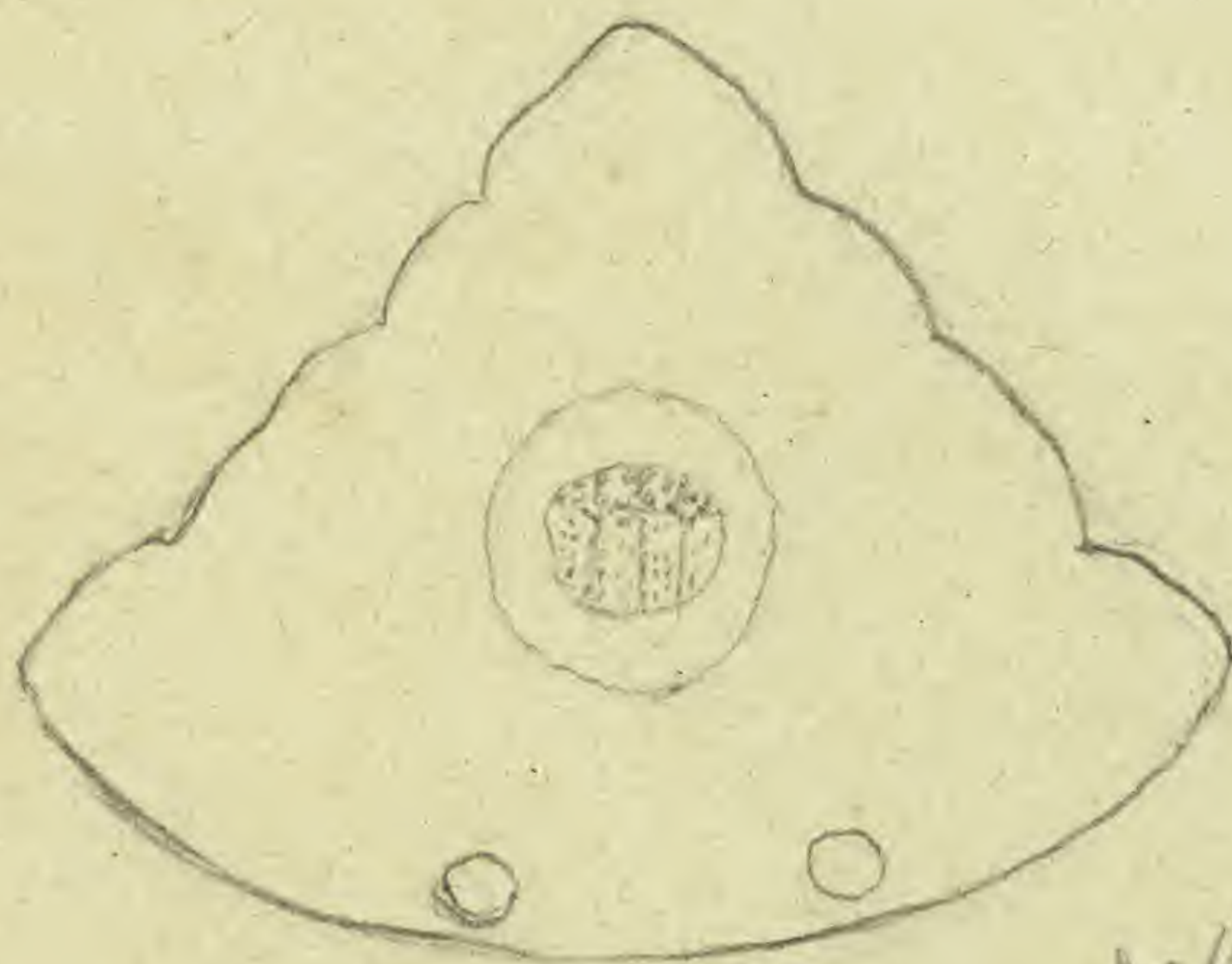
Pinus aristata var

California, Hoffmann leg.

April 1 1871

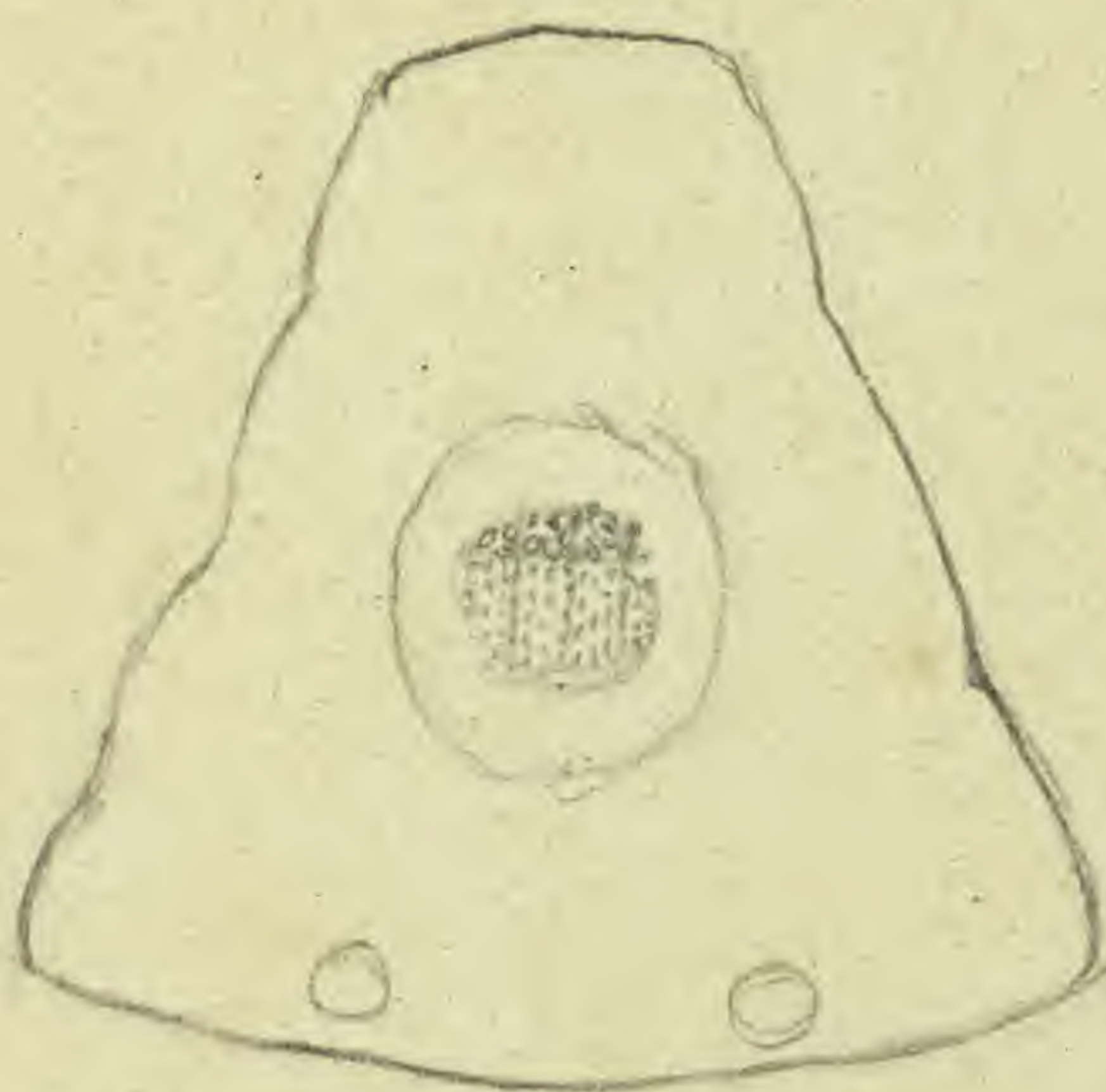
A. Gray mis.

x 30



different sections of leaf

x 30



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Leitch & Corlies

DRUGGISTS

South West
Corner Fifth
and Market
Streets

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GARDEN

P. aristata ♂

April 30 1878

Colorado de Parry



x30



one duct or none

surround, when present by hypoderm

from branch with male fl.



branch with

♀ fl

2 ducts, sometimes
slender obl. horizontal,
always approached.



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11384

HENRY T. BOHLING,

APOTHECARY,

No. 2600 Laclede Ave., S. W. Cor. Jefferson Ave.,
ST. LOUIS, MO.

No.

Date,

187

R

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

Geo. Engelmann, M. D.,

No. 3003 Locust Street,



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MISSOURI
BOTANICAL
GARDEN

13 Feb

19.20

Pin monophylla

1 fl *P. latissquama*

383-96



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GARDEN

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GEORGE ENGELMANN PAPERS



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Pinus monophylla
Utah H. Engelm

Oct 22 1863



outer view
a under, convex
b upper, flatter side

$\frac{1}{8}$ line



thickness of scale x30



x4 subterminal!
pubescent



MISSOURI BOTANICAL GARDEN

MISSOURI BOTANICAL GARDEN

MISSOURI BOTANICAL GARDEN

MISSOURI BOTANICAL GARDEN

MISSOURI BOTANICAL GARDEN



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Pinus monophylla Clos

Oct 28 1865

abortive ament with
11 involucre scales



(Copy sent to Adams)



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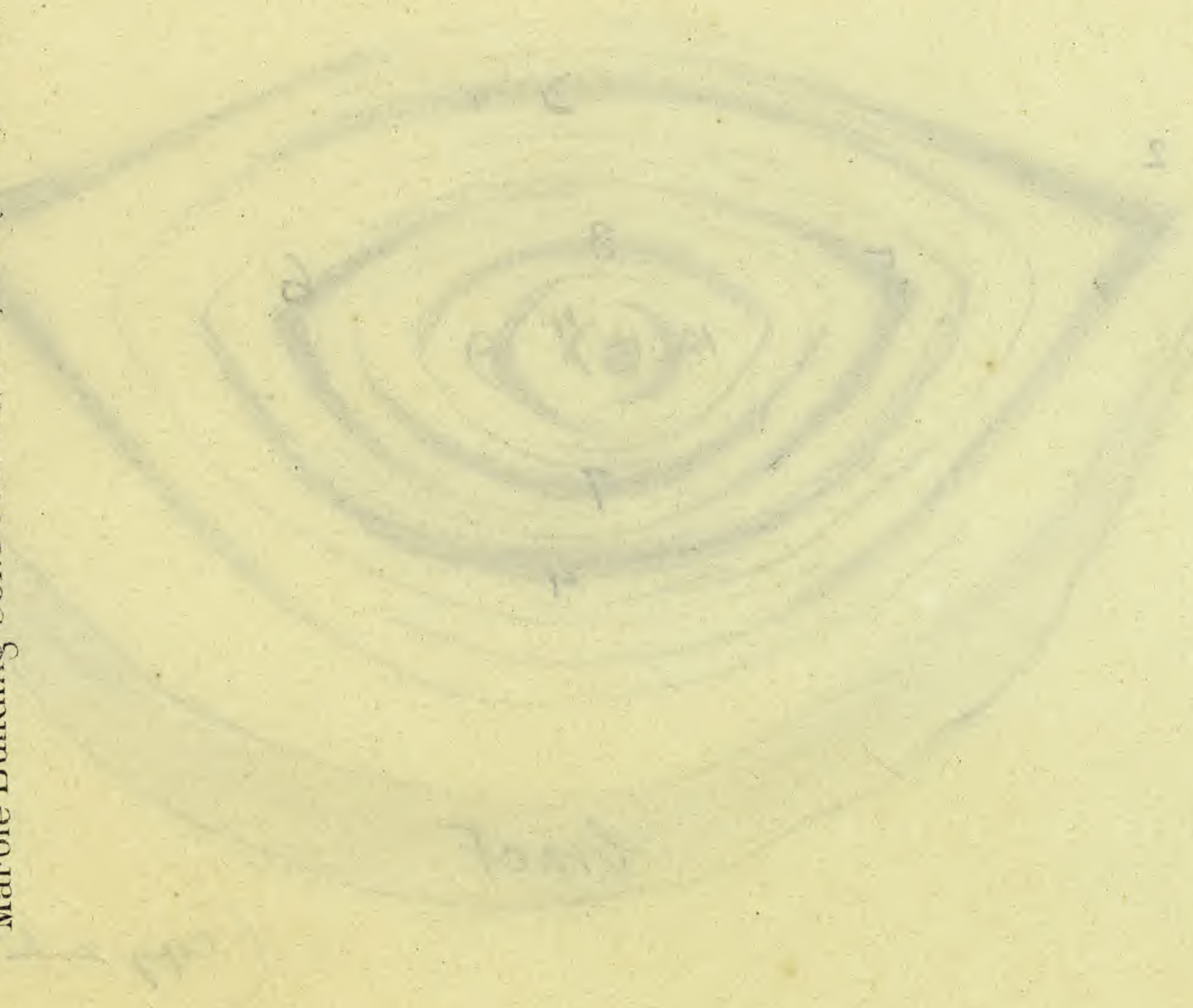
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GEORGE ENGELMANN PAPERS



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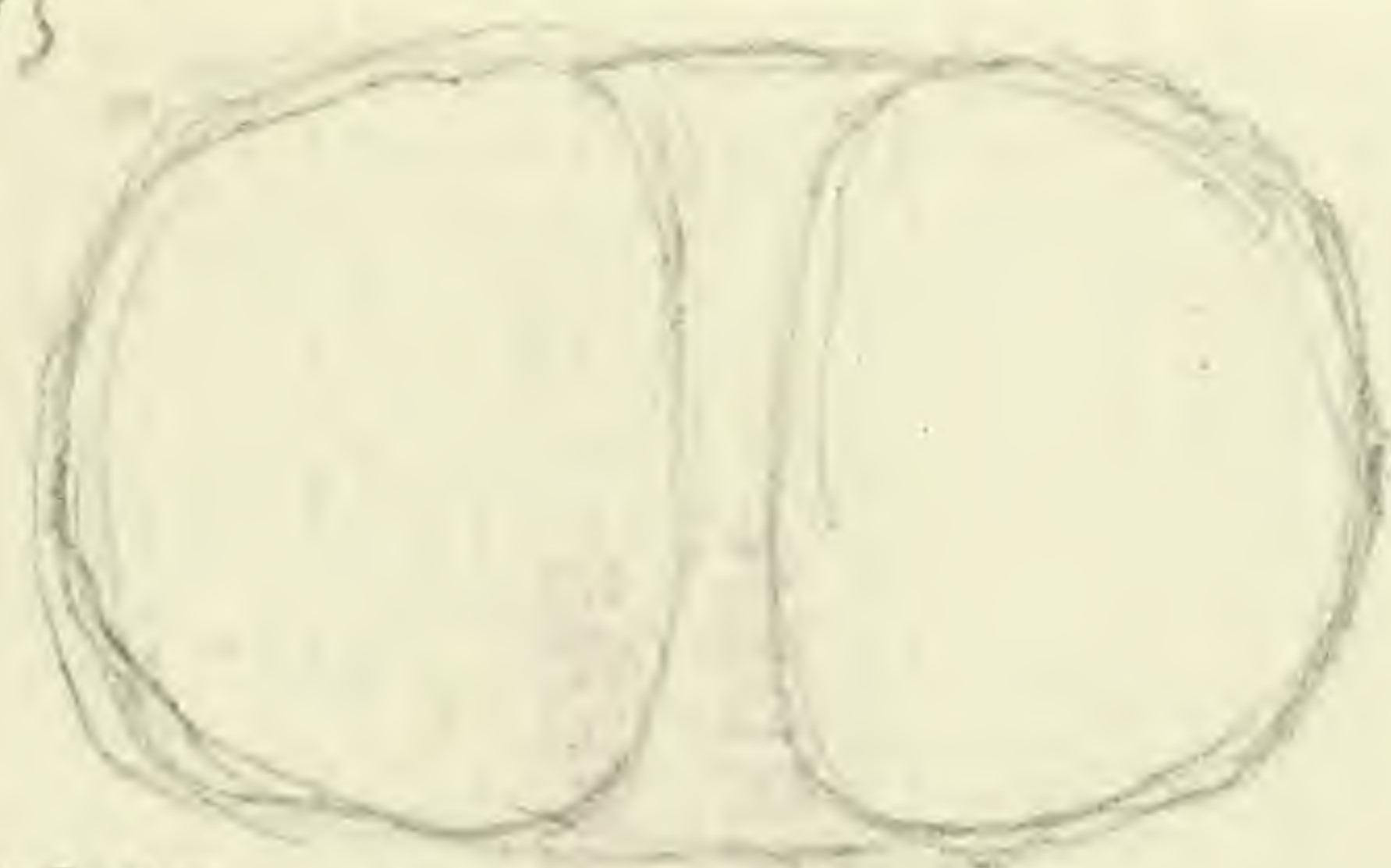
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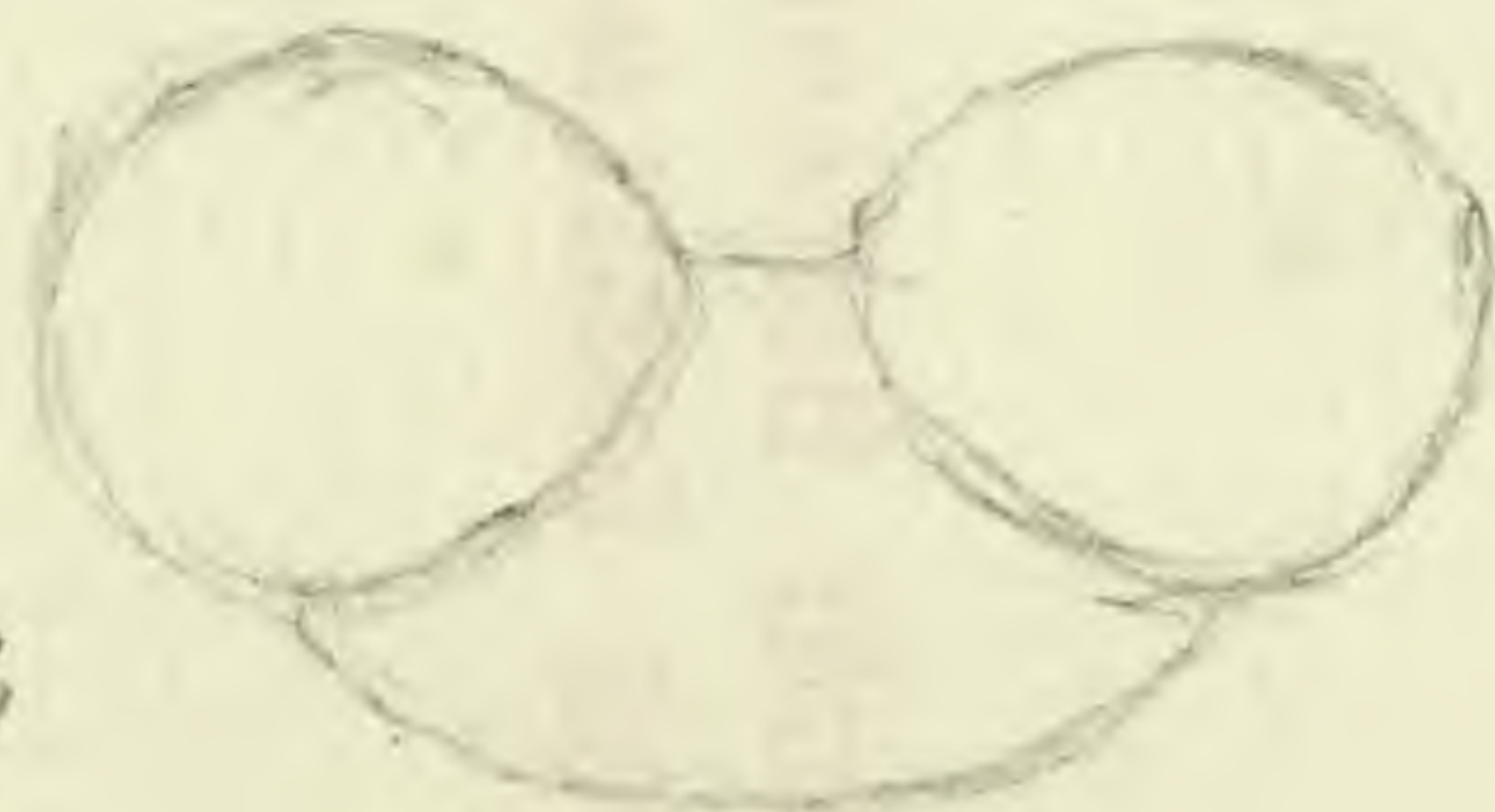


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BOTANICAL
GARDEN

X415



0.035



0.034



0.029

Pinus monophyllus
Utah, H. Engelman

Oct 26 1863

July 4 1859

aborted umbel with 11
involucral scales



X4



6 invol scales



X10

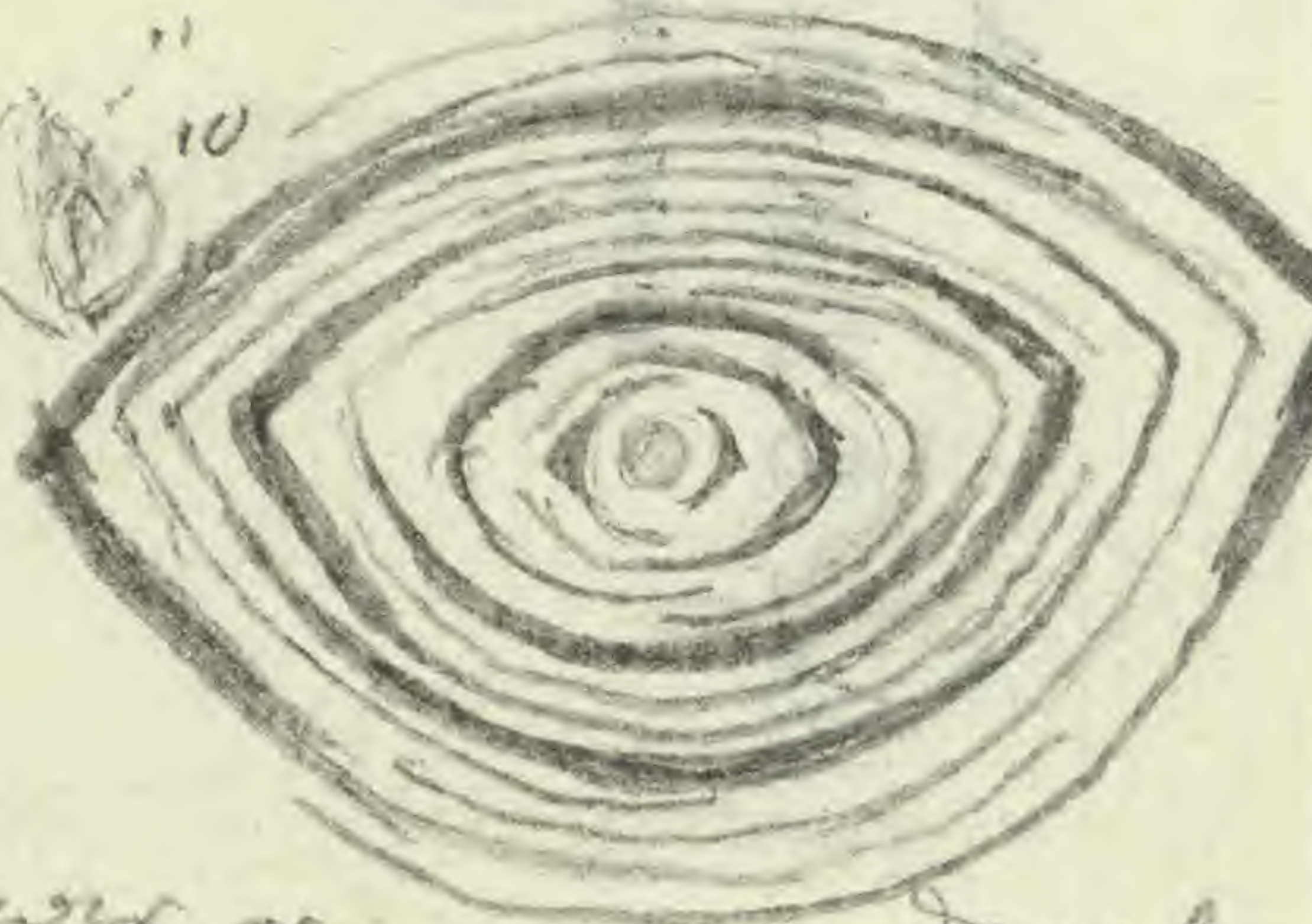


0.034 - 0.036

0.028 - 0.037

0.028 - 0.031

0.033



a. lower or dorsal
b. upper or ventral side



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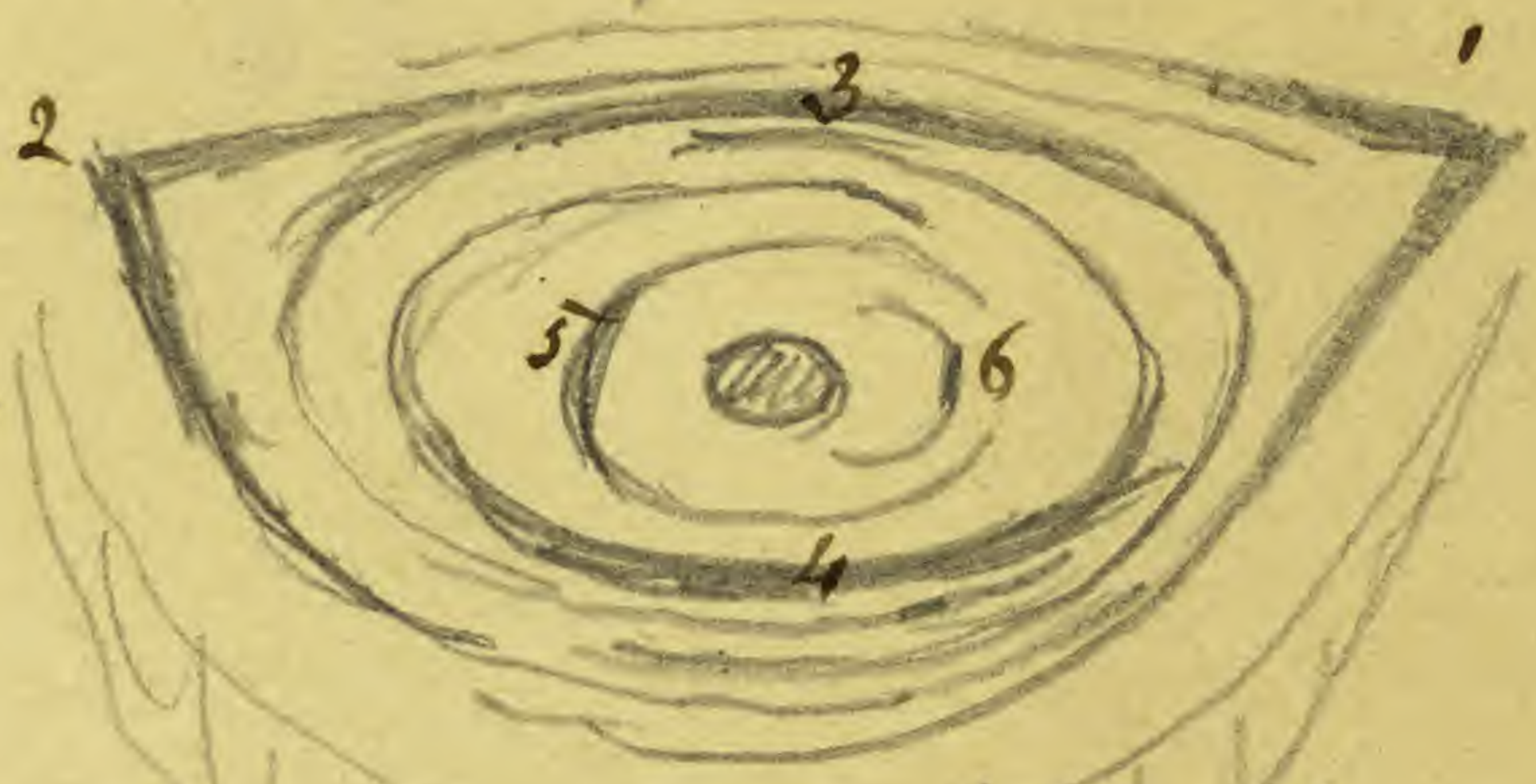
Pinus monophylla

Oct 29 1863

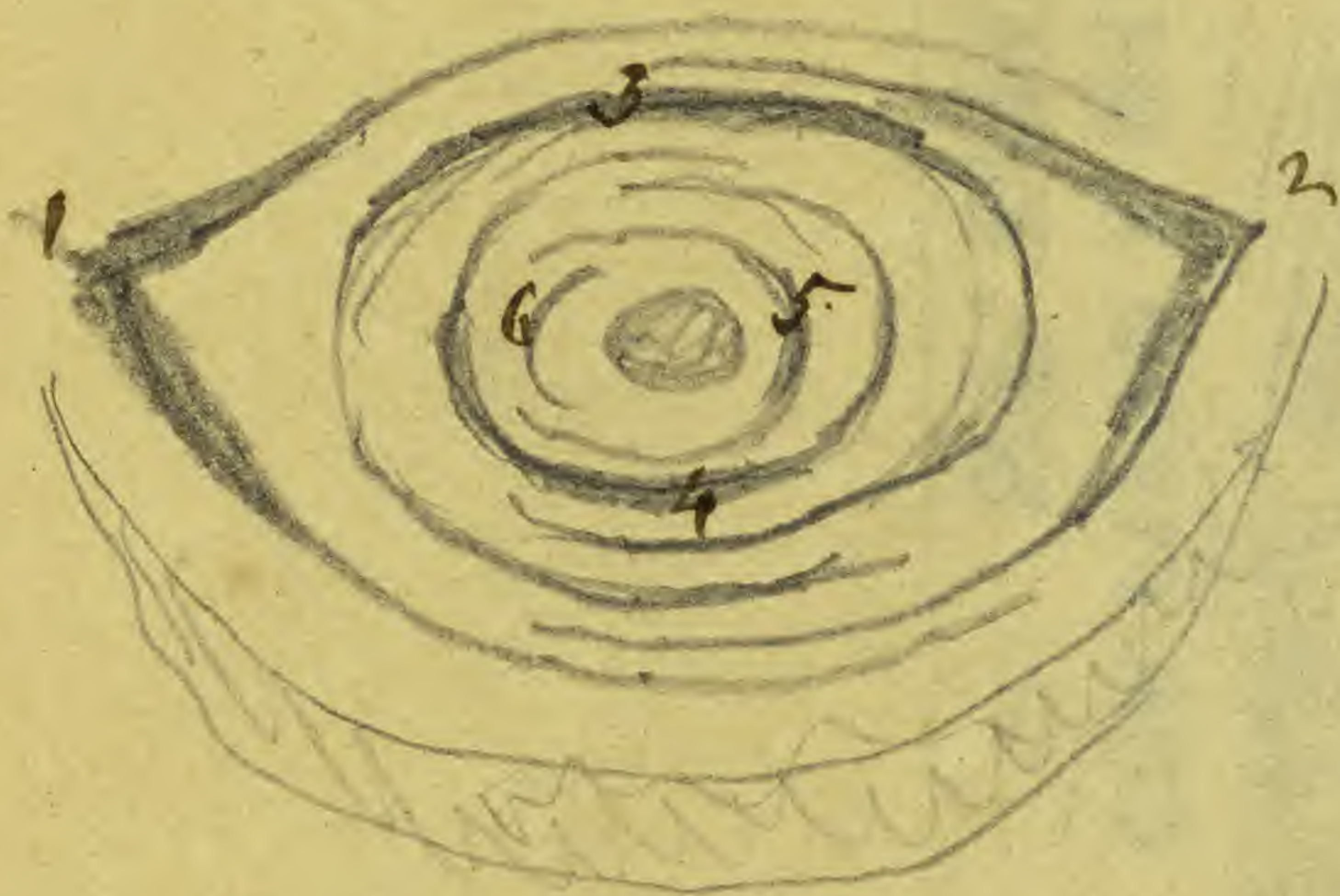
Fremont's original spec. —

male inflorescence very young, bracts already
broken off at tip: involucred anthers antheriferous
 $1\frac{1}{2}$ lines long; anther itself scarcely $\frac{1}{2}$ line long.

3 anthers examined with 6, 1 with 5 involucre
scales;



arrangement of scales
seen 3 times



arrangement of scales
seen once in the same
inflorescence



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DRUGGISTS

COR. FIFTH & MARKET STREETS,

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J. M. Kitznick & Co. Cor. Main & N. W. 10th.

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GEORGE ENGELMANN PAPERS



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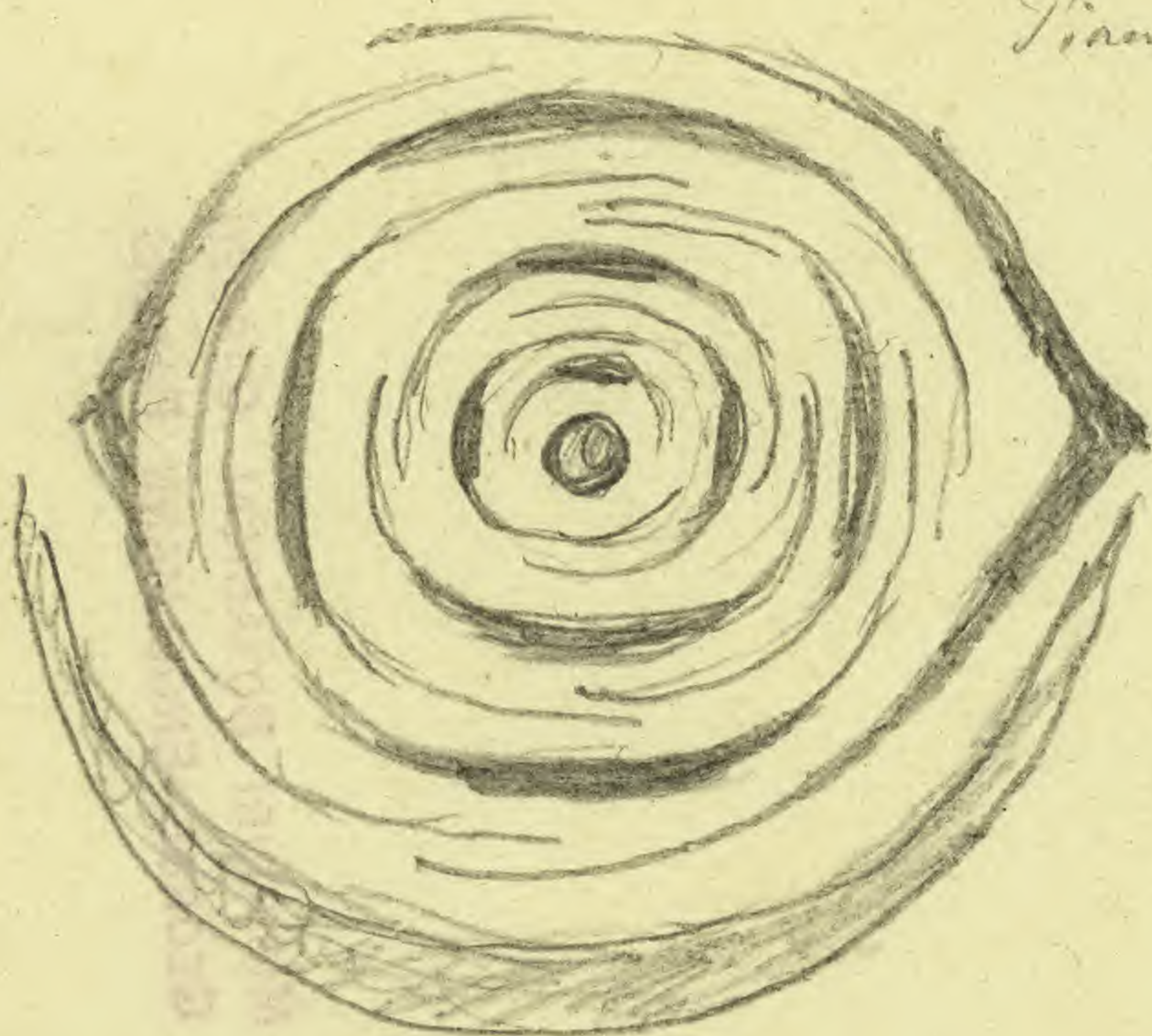
MISSOURI
BOTANICAL
GARDEN

Pinn. monophyllos

30 Oct 1863

H. Engelm. Utah 1849

Sheath of leaf



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11
2.5.10 ① 9.6.1
7
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GEORGE ENGELMANN PAPERS

1.2.9 0.1.2.2
470000



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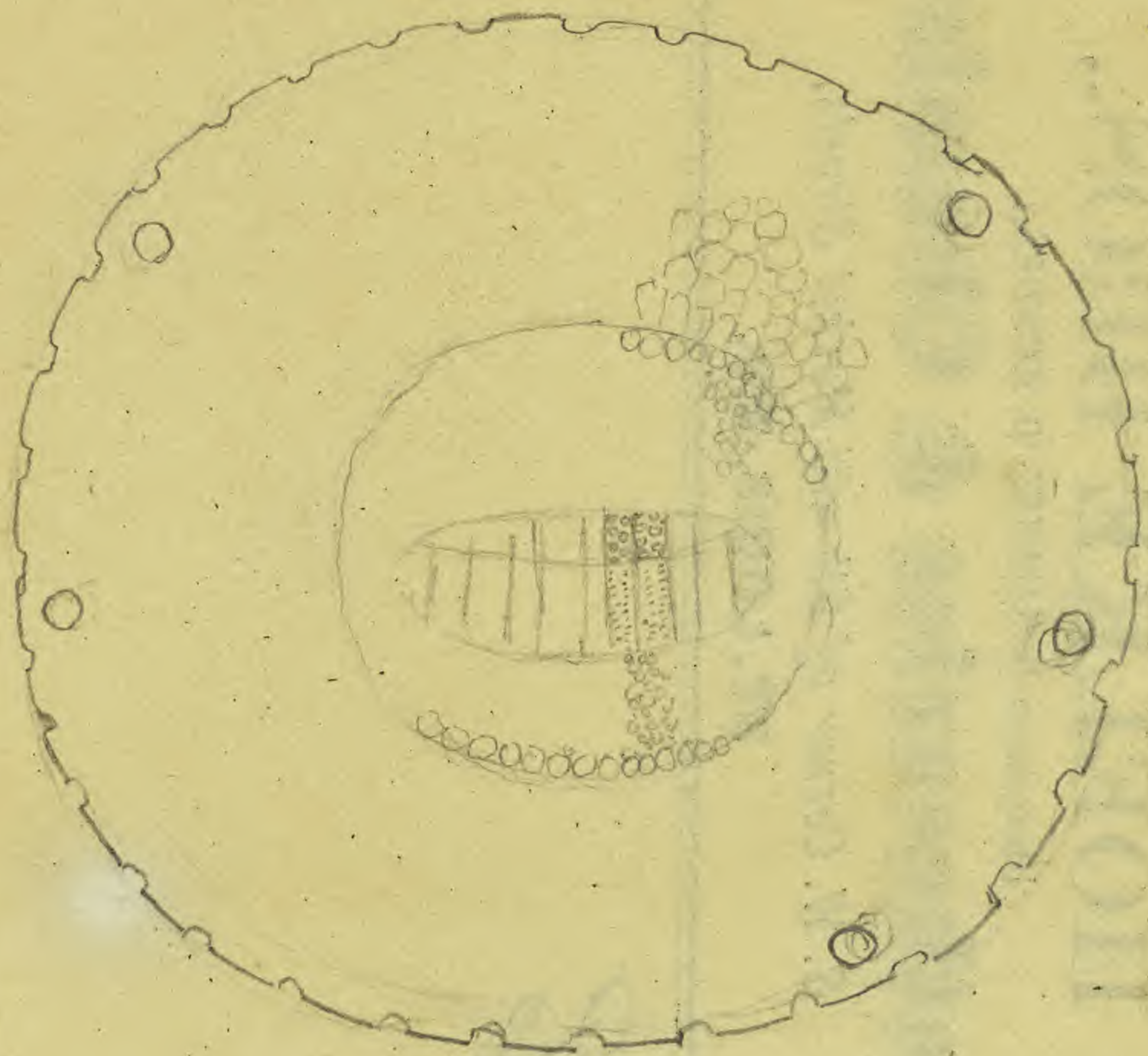
MISSOURI
BOTANICAL
GARDEN

Pinus monophylla

May 5 1871

monotris Calif. Hobland

x 30



x 30

upper side of terete leave somewhat
incurved - on this side always
the ligneous fibres

largest leaves, 20-25 lin long



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HOELKE BROS.,

[Successors to SAMUEL D. HENDEL,]

Apothecaries & Chemists,

S. W. Corner of 6th and Market Streets,

ST. LOUIS, MO.

R

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS



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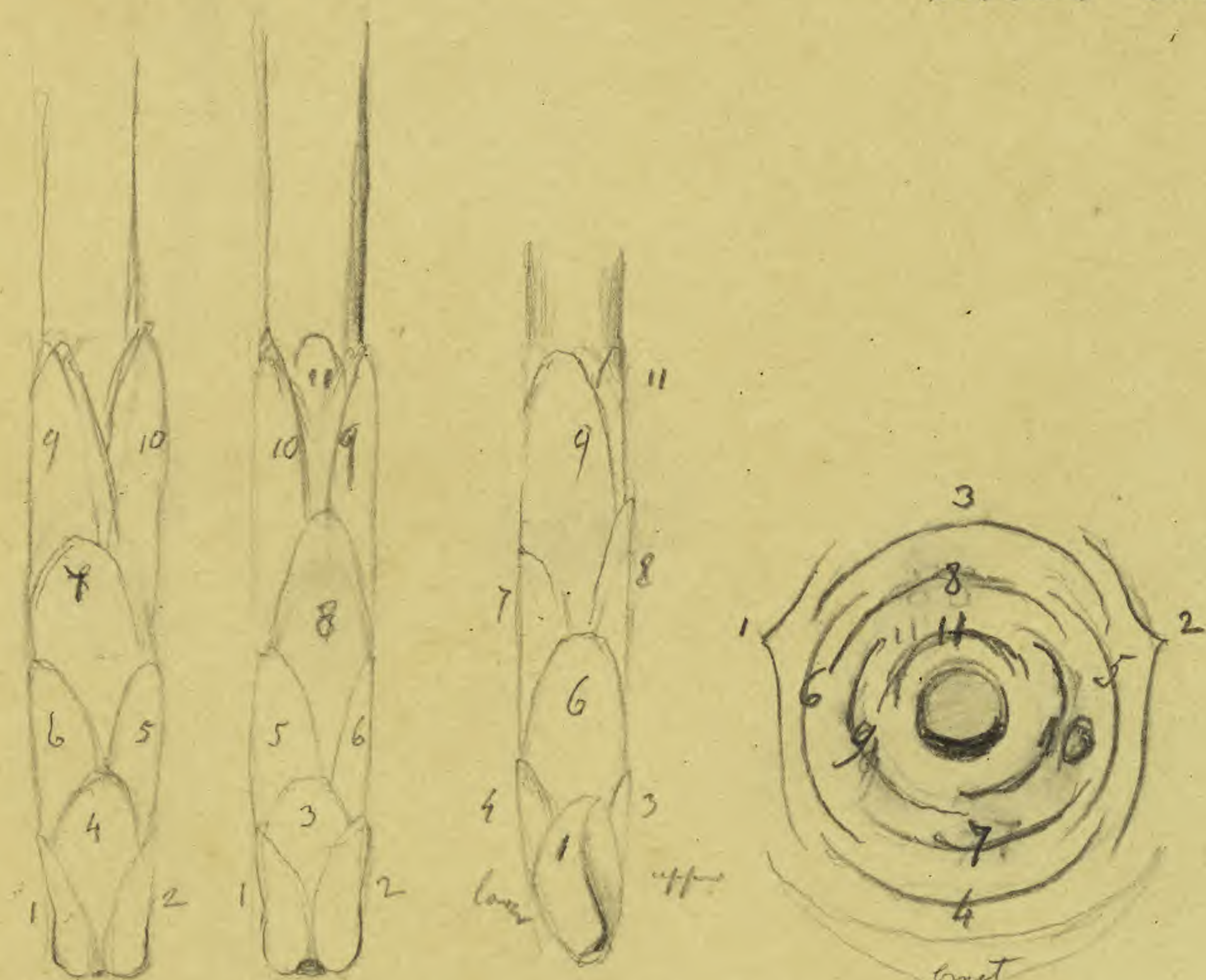
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Pinus monophylla
 Mono Trail, Calif.

May 6 1871
 Bolander



lower
 outer
 side

upper
 inner

side view

among a dozen leaves I find always
 11 involucral scales, the 12th is the leaf!



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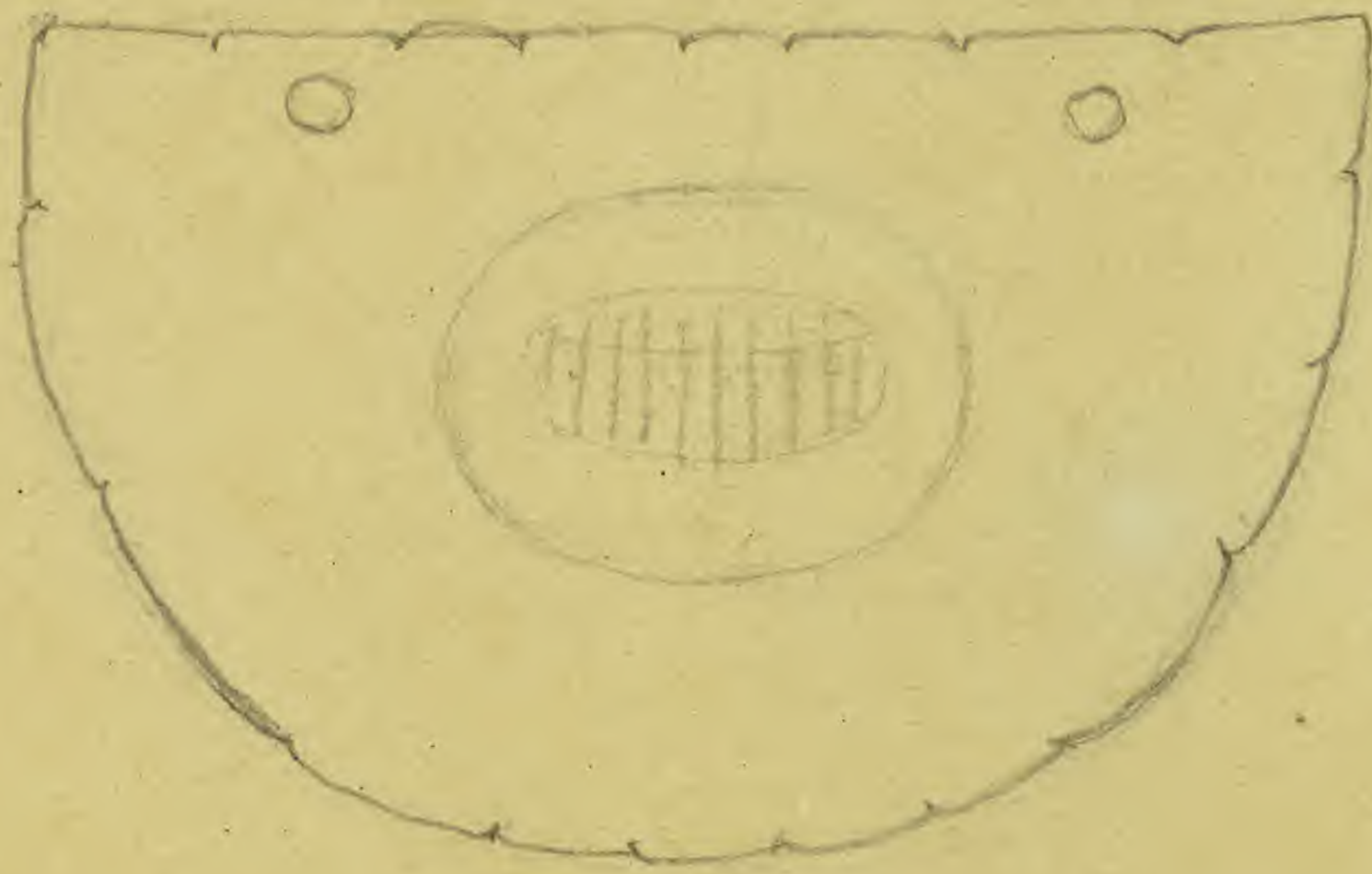


MISSOURI
BOTANICAL
GARDEN

P. monophyllus
2 leaves, very rare,

May 7 1871
Monotrail Calif. Bolander
leaves, 2 1/4 inches long

x 30



margin entire



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MISSOURI
BOTANICAL
GARDEN

Picea monophylla

April 13 1875
-15

St George Utah



left hand seed

right hand
aborted seed,
all covered with
wing

x2



Set of scale
with bract and
wing & seed



large seed with 10
small with 7 Cotyled.



scales in 8/13



0 1 2 3 4 5 6 7 8 9 10

cm

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N. W. Corner Easton and Garrison Ave's.

POOL & CO.

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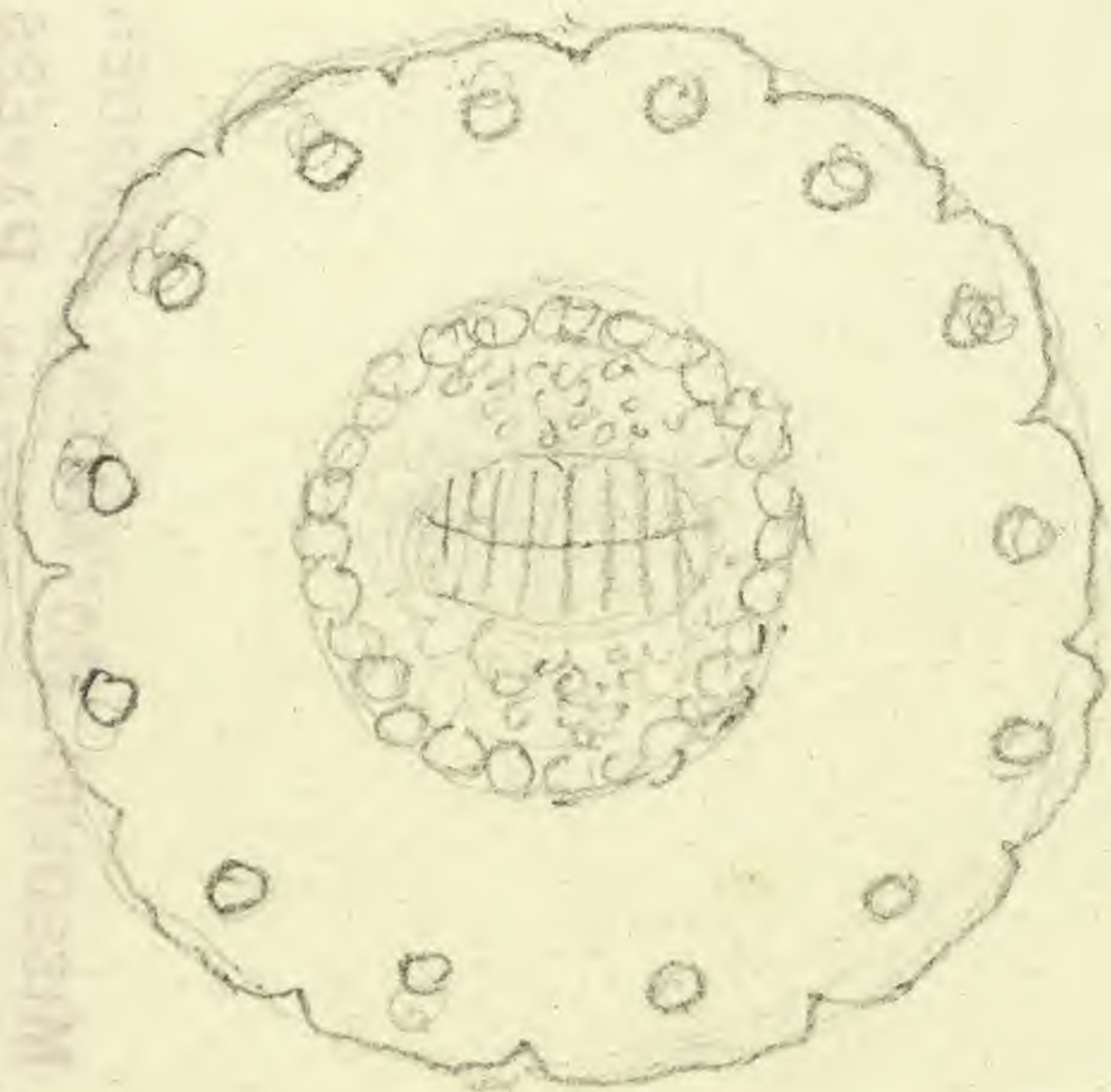


MISSOURI
BOTANICAL
GARDEN

Picus monophyllus

10' Oct 1875

x 30



San Diego

124 ducts



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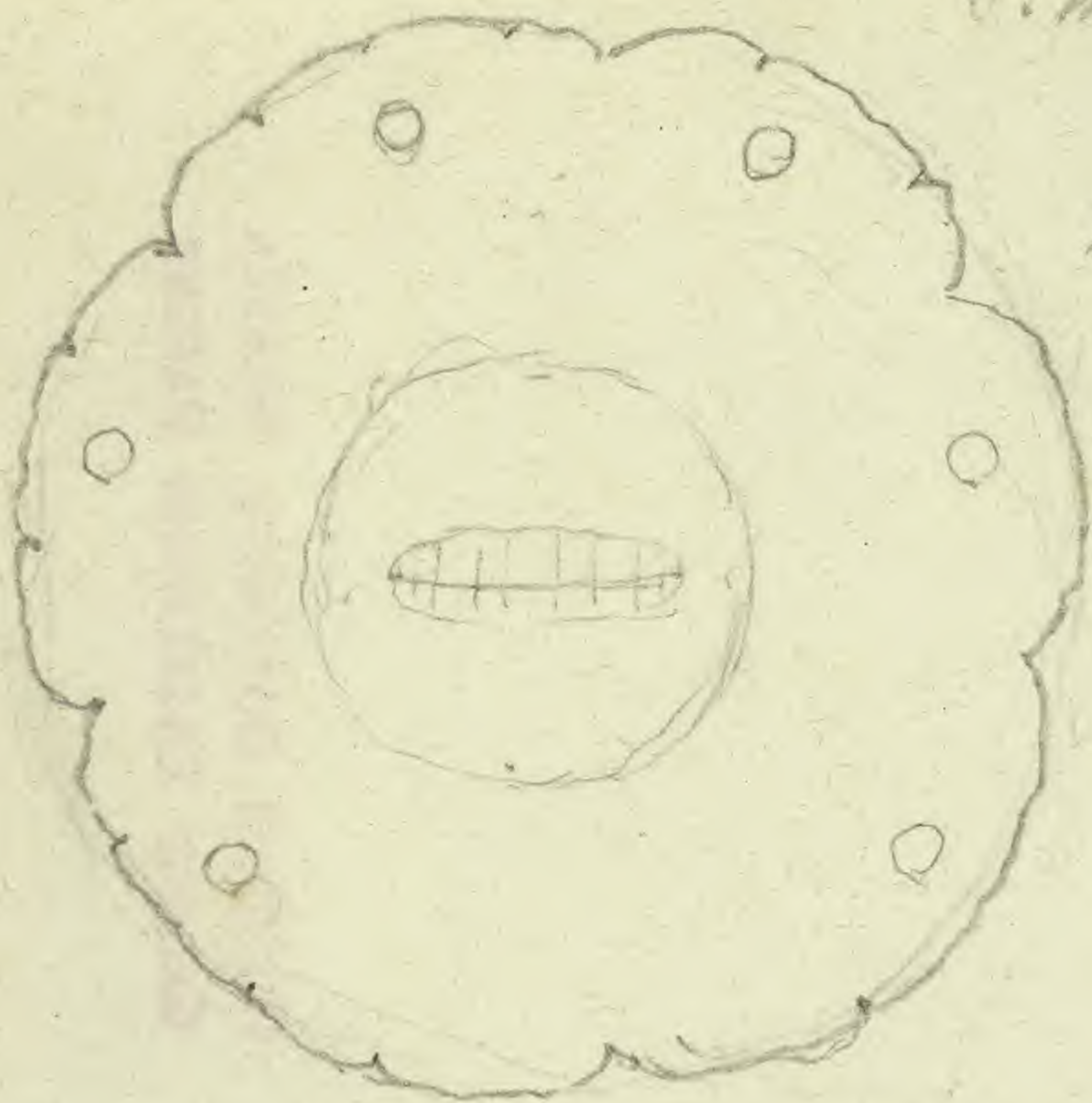
MISSOURI
BOTANICAL
GARDEN

P. monophyllos

Oct 19 1875

Bolander, Sierra Nevada

x 30



6 ducts

single leaf

pair of leaves



reexamined 6 May 1878

5 ducts found the same,
hypoderm strong all around
and around 5 ducts.



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Cor. 4th & Olive Sts., St. Louis.

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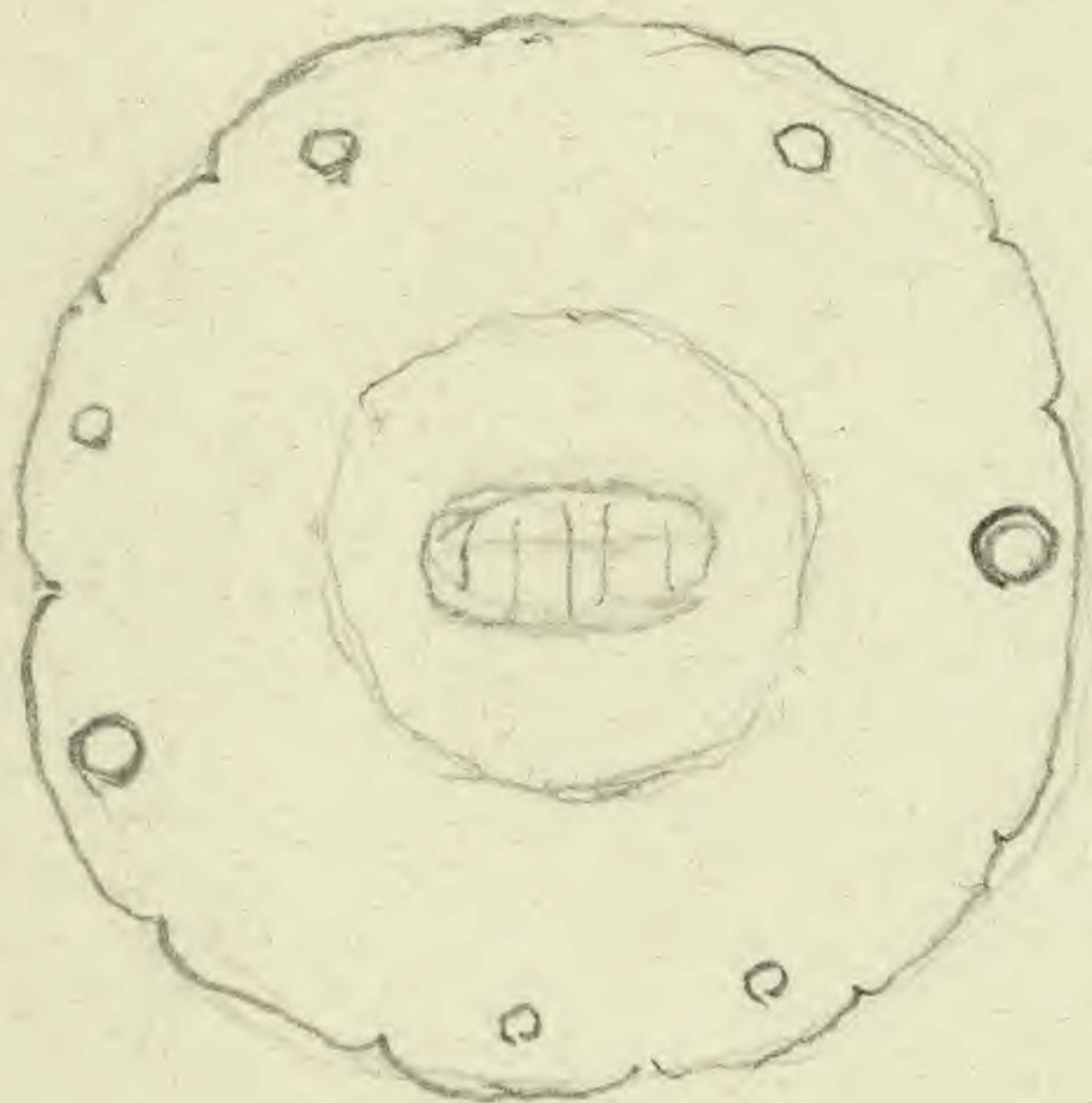
MISSOURI
BOTANICAL
GARDEN

P. monophylos

Oct 19 1875

Utah, Henry Engelmann 1859

X30



7 ducts



Aug 6 1878



5 ducts



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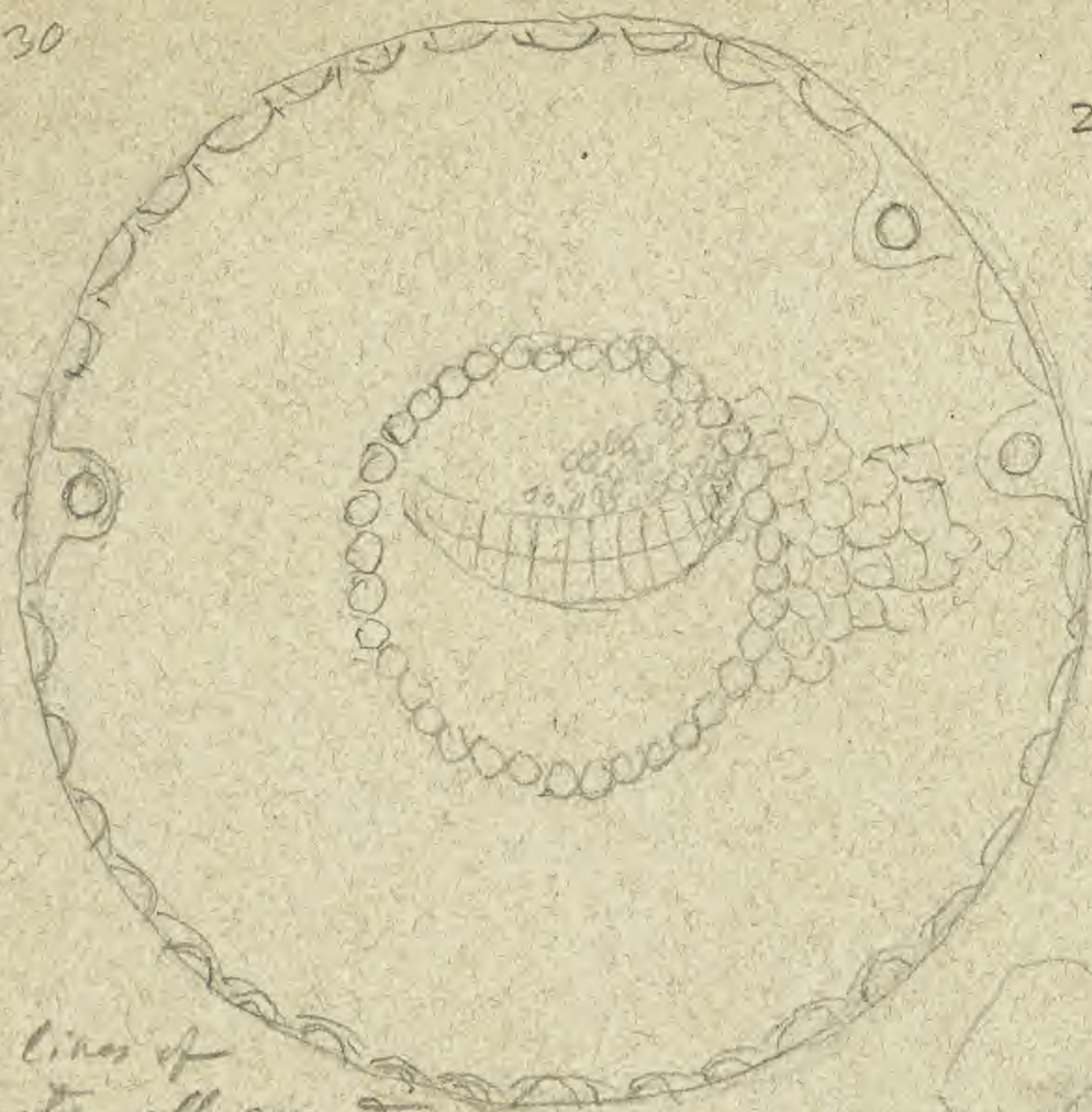


MISSOURI
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GARDEN

Pisona monophylla
 Rothrock

Feb 22 1876
 S. Calif. 1875

x 30



2 principal lateral
 hypodermis ducts
 1 supplementary one
 all surrounded by
 epidermis bundles

x 30



30-40 lines of
 stomata all around
 divided by bundles of hypodermis cells



x 150



0 1 2 3 4 5 6 7 8 9 10

cm

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ALL THE NEW REMEDIES
CONSTANTLY ON HAND

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GEORGE ENGELMANN PAPERS



0 1 2 3 4 5 6 7 8 9 10

cm

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GARDEN

Pinus latisquama

Nov 8 1873

x 30

in Hb. Cambridge

leaves terete; sheaths deciduous first or 2^d autumn



folia tereta

strengthening cells all around and within the sheath; ducts peripheral, dorsal, near the edges - sparingly surrounded with strengthening cells

edge of leaf without teeth

3-4 series of stomata on each of the upper sides, none on back

x 4



Pollen not fully mature

largest and most regular grains

$$\frac{26-28}{415} = 0.062-0.067 \text{ mm}$$

♂ bud - involucre
scales probably 6, the 2 lateral outer ones not seen

distinctly - Commisures of anthers with a short denticulate point or transverse crest.



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cm

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MISSOURI
BOTANICAL
GARDEN

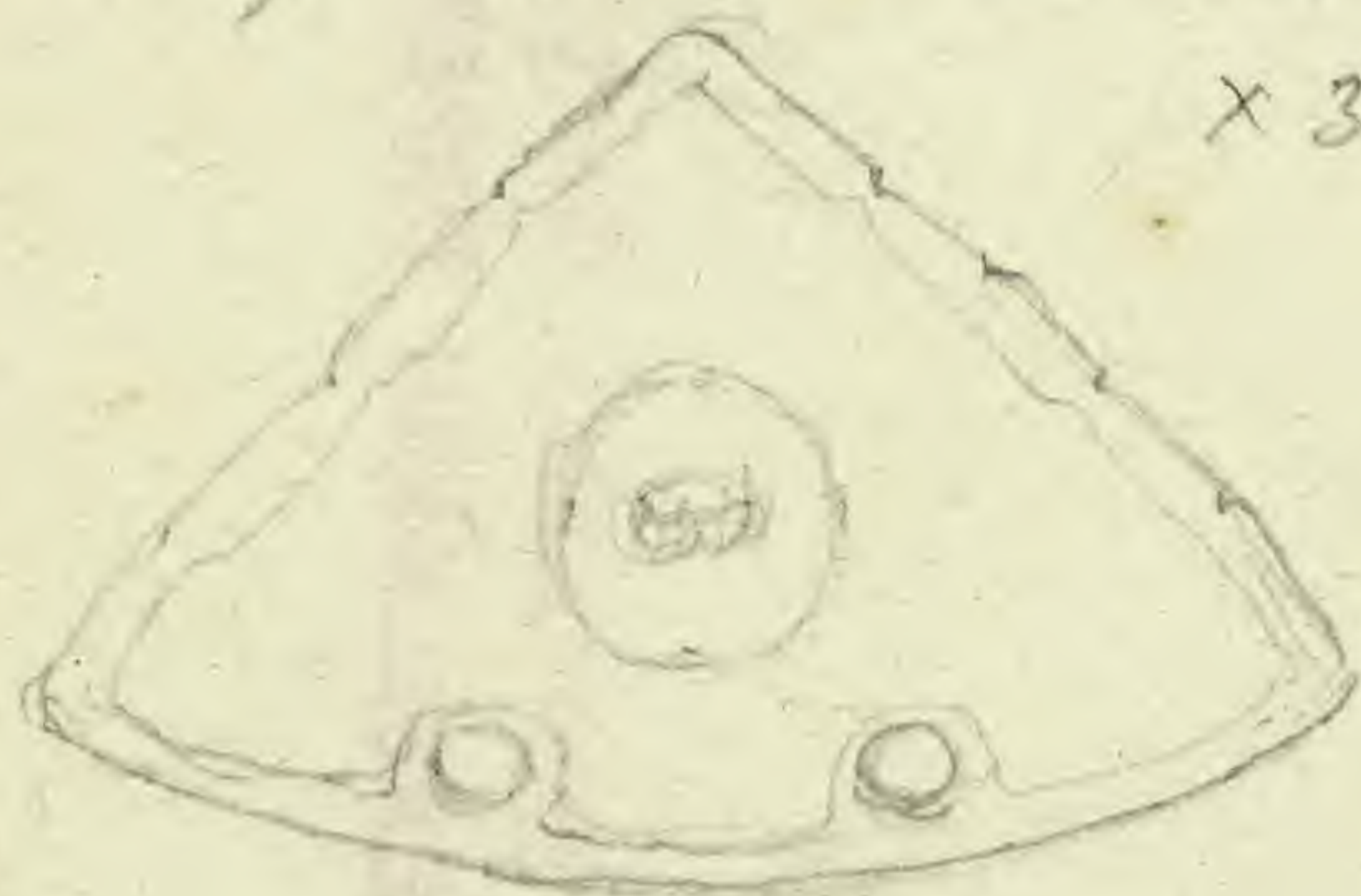
P. Balfourii - racemosa

March 2 1876

High Mountains of S. Utah

leaves of the same bundle

A. L. Siler mss 1876



x30



hypoderm all around, and around
ducts except where (only on upper side,
interrupted by stomata, of which 3-5
lines on each side



no teeth!

x4

scale of young cone



0

1

2

3

4

5

6

7

8

9

10

cm

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MISSOURI
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GARDEN

11400

Alex. Leitch,
APOTHECARY & CHEMIST,

Cor. 4th & Olive Sts., St. Louis.

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS



0 1 2 3 4 5 6 7 8 9 10

cm

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